We claim:

1. A process for preparing aromatic diisocyanates by reaction of phosgene with diamines in the gas phase, wherein the reaction is carried out in a reaction zone in which the pressure is more than 3 bar and less than 20 bar.

2. A process as claimed in claim 1, wherein the temperature in the reaction zone is selected so that it is below the boiling point of the diamine used under the pressure conditions prevailing in the reaction zone.

3. A process as claimed in claim 1 or 2, wherein an inert medium is fed into the reaction zone in addition to diamine and phosgene in such an amount that the concentration of inert medium at the outlet from the reaction zone is more than 25 mol/m^3.

4. A process as claimed in any of claims 1 to 3, wherein the concentration of phosgene in the reaction gas at the outlet from the reaction zone is more than 25 mol/m^3.

5. A process as claimed in any of claims 1 to 4 which is carried out continuously.

6. A process as claimed in any of claims 1 to 5 which is carried out in a production plant in which the phosgene holdup in the reaction zone for the reaction of the aromatic diamine with phosgene in the plant is less then 100 kg.

7. A production plant for preparing aromatic diisocyanates by reaction of phosgene with diamines in the gas phase at a pressure of more than 3 bar and less than 20 bar which has a ratio of production capacity to phosgene holdup of more than 3200 [metric tons of diisocyanate per year/kilogram of phosgene].

8. A production plant as claimed in claim 7 which has a production capacity of more than 50 000 metric tons of diisocyanate per year.